



## **An analysis of multiple nominative constructions in Korean: Within LFG adopting Generative Lexicon\***

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**Lee, Hae-Yun. 2023. An analysis of multiple nominative constructions in Korean: Within LFG adopting Generative Lexicon.** *Linguistic Research* 40(2): 271-297. Korean has a so-called 'Multiple Nominative Construction' (MNC) where more than one subject appears in a clause. In this paper, we will try to analyze the MNC specific to Korean within the framework of LFG (Lexical Functional Grammar). First, we present the syntactic structures of MNC, where we adopt the mechanisms such as the grammatical function PREDLINK and the empty category 'epsilon' proposed in LFG literatures. Next, we discuss the constraints for semantic relations. We try to extend the rules and lexicon by adopting Qualia Structure of Generative Lexicon, to describe semantic relations between nouns. Lastly, we discuss the cases of the reverse-ordered MNC with respect to information-structural concepts such as topic and focus. Our analyses are implemented on XLE, the platform of LFG, which enables us to prove the validity of the linguistic analysis. (Hankuk University of Foreign Studies)

**Keywords** multiple nominative construction, LFG, XLE, Generative Lexicon, information structure

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## 1. Introduction

We find in Korean the following examples where more than one subject appears in a clause.<sup>1 2</sup>

- (1) a. khokkili-ka      kho-ka      kil-ta  
 elephant-NOM    nose-NOM    long-DEC  
 ‘An elephant’ nose is long.’
- b. Taykwu-ka      kwail-i      sakwa-ka      ssa-ta  
 Taykwu-NOM    fruit-NOM    apple-NOM    cheap-DEC  
 ‘In Taykwu, apple among fruit is cheap.’

In Korean, the case markers *i/ka* represent a grammatical relation subject. The NPs in (1) are marked by *i/ka* and are subjects on the surface. Those sentences are called ‘Multiple Nominative Construction (MNC)’ which seems to violate a linguistic principle that says that a sentence should have only one subject.<sup>3</sup> For this reason, there have been many attempts to explain MNC. However, there are still problems to be solved. In this paper, we will analyze the MNC specific to Korean within the framework of LFG (Lexical Functional Grammar) and its implementation system, XLE (Xerox Linguistic Environment). Especially, the analysis is to center around the explanation of the following examples.

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1 The following abbreviations are used in glosses: NOM = nominative; ACC = accusative; DAT = dative; TOP = topic; FOC = focus; DEC = declarative; QUE = question; PRS = present; PST = past; CONJ = conjunction; MOD = modifier; NM = nominalizer; HON = honorific.

2 There is a so-called MAC (Multiple Accusative Construction) where more than one object appears in a clause, as we see below. MNC is different from MAC in some respects, although some studies tried to explain two constructions in the same way. We do not deal with MAC in this paper.

(i) Chelswu-ka    khokkili-lul    kho-lul    cap-ass-ta  
 Chelswu-NOM    elephant-ACC    nose-ACC    catch-PST-DEC  
 ‘Chelswu caught the nose of an elephant.’

3 The principle is realized as Subject Condition in LFG and Extended Projection Principle (EPP) in Minimalism.

(i) Subject Condition: “Every predicator must have a subject.” (Bresnan et al. 2016: 334)

(ii) EPP: “A tensed TP must have a subject.” (Sportiche et al. 2014: 215)

- (2) a. \*sakwa-ka    kho-ka    kil-ta  
       apple-NOM nose-NOM long-DEC  
       b. kho-ka    khokkili-ka    kil-ta  
       nose-NOM elephant-NOM long-DEC

The sentence in (2a) is ungrammatical. Compared to subjects in (1a), the subjects in (2a) seem to have no semantic relation among them. The subjects in (2b) appear in reverse order, compared to those in (1a), and the meaning of the sentence (2b) is different from that of (1a). Therefore, it seems that there are some constraints related to semantic relations and precedence among subjects.

This paper is organized as follows. In section 2, we present the syntactic structures of MNC, where we adopt the mechanisms such as the grammatical function PREDLINK and the empty category ‘epsilon’ proposed in LFG literatures. In section 3, we discuss the constraints for semantic relations. We try to extend the rules and lexicon by adopting Qualia Structure of Generative Lexicon, to describe semantic relations between nouns. In section 4, we discuss the cases of the reverse-ordered MNC with respect to information-structural concepts such as topic and focus. Section 5 concludes the paper.

## 2. Syntactic structure

Let us treat the syntactic structures in MNC. As for grammatical relations, the NPs with a nominative marker seem to be subjects. However, only one NP becomes a subject in a sentence, as we mentioned in section 1. The question now arises: What is the linguistic status of the other remaining NPs with a nominative marker? There is still no unified answer to the question, although various idea has been proposed in previous works.<sup>4</sup>

In this paper, we follow the view that the NPs marked with a nominative case are formally subjects, that the second NP and a predicate build a ‘predicate clause’ or a ‘small clause’ due to Subject Condition, and that the first NP functions as a genuine subject (Huh 1983; Heycock and Lee 1989; Chae and Kim 2008; Kwon 2012). The

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4 For example, the first NP has been treated as a non-argument such as an adjunct, a focus, or a topic (Yoon 1986; Im 2007; Ryu 2013; Hong 2014). However, it remains controversial what the grammatical status of the non-argument is.

following shows an overview of the proposal.<sup>5</sup>

(3) Chelswu-ka	son-i	khu-ta.	
Chelswu-NOM	hand-NOM	large-DEC	
	subject	predicate	
subject	predicate		

In (3), a predicate *khu-ta* and a neighboring NP *son-i* build a clause by the relation of subject-predicate, that clause becomes a predicate, and the newly produced predicate *son-i khu-ta* and the first NP *chelswu-ka* build a clause again.

However, it is not clear how the small clause changes into a predicate because there is no explicit marker for a predicate. If we try to analyze an MNC according to the 'predicate clause' approach, we need a predicate that combines a predicate clause with a remaining subject. Therefore, we assume the null predicate that is responsible for the combination of a subject and a predicate. Now we can give the following syntactic structure for (3), adopting the null predicate  $\Phi$ .

(4) [S [NP chelswu-ka] [VP [S son-i khu-ta] [V $\Phi$ ] ] ]
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Considering the word order SOV, we set up the null element at the rightmost position. Considering its function, we can say that the element corresponds to a copula *i-* which combines two elements into one clause. Below we examine the data that support the view about the copula *i-*.

The copula *i-* is not used alone but is combined with a noun to form a predicate. We can find some predicates which behave like *i-*. Consider the following examples:

- (5) a. ku ai-ka           sensayngnim-eykey chakhakey kwul-ess-ta.  
       the child-NOM teacher-DAT           nicely           act-PST-DEC  
       'The child behaved kindly to the teacher.'
- b. Chelswu-nun   kyoswu-kath-ta.  
       Chelswu-TOP   professor-like-DEC  
       'Chelswu is like a professor.'

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<sup>5</sup> This proposal reflects the view of a discourse structure, where a sentence is divided into a theme and a rheme, and the latter can be divided into theme and rheme again (Hong 2014).

- c. Chelswu-ka kongpwu-ha-n-ta  
 Chelswu-NOM study-do-PRS-DEC  
 ‘Chelswu studies.’
- d. Chelswu-ka haksayng-i-ta  
 Chelswu-NOM student-be-DEC  
 ‘Chelswu is a student.’

Generally, predicates alone require their arguments. However, the predicates alone in (5) don’t require their arguments. The predicate *kwul-* in (5a) is imperfect and becomes a predicate after it combines with the adjective *chakhakey*. The predicates in (5b)-(5d) are combined with a noun to form a predicate. There are differences in the lexicality of the predicates: The predicate in (5b) has some lexical meaning, that in (5c) is a so-called light verb that is combined with a verbal noun, and that in (5d) is a copula that is to be dummy verb whose meaning is inherited from a combined noun. Seen from the gradability of lexical meanings, the copula seems to be the weakest predicate.<sup>6</sup>

Next, let us turn to the argument structure of *i-*. Intuitively seeing, we cannot say that the noun *haksayng* in (5d) corresponds to the argument of *i-* because *i-* is considered to be a dummy verb. Therefore, we have 3 options about the argument structure of *i-* as follows (Nordlinger and Sadler 2007).

- (6) a. student<(↑SUBJ)>  
 b. be<(↑XCOMP)>  
 c. be<(↑SUBJ)(↑PREDLINK)>

In the first case (6a), a noun subcategorizes for a subject instead of a copula. However, it is not correct for *i-*. The reason is that a noun except for verbal nouns or relational nouns cannot subcategorize for arguments and that a copula must appear anyway because it has some information such as tense, honorification, and modality. In (6b), copula verbs were analyzed like raising verbs that subcategorize for the grammatical function XCOMP

6 There is controversy about the morphological or the syntactic status of the copula *i-*. In the school grammar, it is analyzed as a predicative marker in the sense that the phrase combined with the copula functions as a predicate in a sentence. Some considered it as a kind of adjective because it conjugates like a verb, and it cannot build imperatives or requests. Others define it as the third category, a copula, because it is different from the typical adjectives. In this paper, we follow the third view.

which is an open clause without a subject. The approach has some problem: In case an argument is realized as an NP, the NP must have XCOMP that function as a predicate, in addition to a semantic form. That is not desirable, because the NP must have double information about one attribute. Lastly, we have option (6c), where a grammatical function PREDLINK is used. The PREDLINK is proposed as follows.

“This representation for predicative constructions models the fact that a particular property is predicated of the subject in a syntactically reasonable way and provides enough information for subsequent semantic analysis.” (Butt et al. 1999: 70)

According to the proposal, the argument after a copula verb represents the specific property of a subject. As for the copula *i-*, we are the view that *i-* is combined with the second NP to form the predicate of a clause (Park 2006). Therefore, a copula verb *i-* is assumed to subcategorize for SUBJ and PREDLINK.

On the one hand, the copula *i-* can be combined with other categories as well as nouns as follows.

- (7) a. ku kos salamtul-un oyppwu-uy pangmwunkayk-eykey  
 the place people-TOP outside-GEN visitor-DAT  
 cektaycek-i-ta.  
 hostile-be-DEC  
 ‘The people there are hostile to visitors from the outside.’
- b. Chelswu-ka ceypep-i-ney.  
 Chelswu-NOM good-be-DEC  
 ‘Chelswu is pretty good.’
- c. Nay-ka kunye-lul alkey toyn kes-un pali-eysepute-i-ta.  
 I-NOM she-ACC know become that-TOP Paris-from-be-DEC  
 ‘It is in Paris that I have known her.’
- d. wuli-ka kuttay cwumokgayss-ten kes-un motun hyensang-i  
 we-NOM then notice-PST that-TOP all phenomenon-NOM  
 talun motun hyensang-kwa sangkwancekiess-um-i-ess-ta.  
 other all phenomenon-CONJ correlative-NM-be-PST-DEC  
 ‘What we noticed then is the fact that all phenomena are correlative  
 with other phenomena.’

For example, the copula *-i* can be combined with adjectives (7a), adverbs (7b), and prepositions (7c). Especially, we see in (7d) that the copula can be combined with a nominalized S. The category S can appear in an embedded context, as we see below.

- (8) a. na-nun Yenghuy-ka ttalaka-ki-lul kitali-ess-ta.  
 I-NOM Yenghuy-NOM follow-NM-ACC wait-PST-DEC  
 'I waited for Yenghuy to follow.'
- b. mence cek-i maypokhay iss-nunka-lul hwakinkayya han-ta.  
 first enemy-NOM ambush be-QUE-ACC check do-DEC  
 'First, you need to make sure the enemy is in an ambush.'

In general, Korean has a few 'transforming affixes' that change a clause into one which performs a certain grammatical function, i.e., the affix *-ki* for a nominal clause in (8a). However, a certain nominal clause performs a grammatical function such as a subject or an object without a transforming suffix as in (8b). In principle, the clause without a transforming affix is more economical than that with a transforming affix, if two clauses play the same role.

On the other hand, the copula is subject to ellipsis. The stem *i* can be deleted according to phonological context as we see in (9a). Furthermore, the whole copula *i* can be deleted in a discourse as we see in (9b).

- (9) a. Chelswu-ka kyoswu(-i)-ta.  
 Chelswu-NOM professor(-be)-DEC  
 'Chelswu is a professor.'
- b. A: cekes-i mwuess-i-nya?  
 that-NOM what-be-QUE  
 'What is that'
- B: cekes-un cokakpwum(-i-ta).  
 that-TOP sculpture(-be-DEC)  
 'That is a sculpture.'

The possibility of deletion is due to the poor lexical meaning of the copula. We can see the ellipsis of a copula in other languages.<sup>7</sup>

- (10) a. On student.  
           he student  
           ‘He is a student.’ (Russian: Dalrymple et al. 2004)
- b. Az igazgató           a szóvivő  
           the director.NOM the spokesman.NOM  
           ‘The director is the spokesman.’ (Hungarian: Laczkó 2012)
- c. hwa ṭālibun  
           He student  
           ‘He is a student.’ (Arabic: Attia 2008)

In summary, we conclude that the empty element in the structure (4) is the null copula. The conclusion is based on the observation: First, the copula is a two-place predicate that is combined with a noun to form a predicate as in (6c). Second, the copula can be combined with S as in (7d). Third, the copula can be deleted because of the meagerness of its lexical meaning as in (9).

Now, let us present the syntactic analyses of the multiple nominative constructions considering the above observation. For a start, we present the syntactic rules for Korean simple sentences as follows.

- (11) a.  $S \rightarrow \quad \text{KP} \quad \quad \text{VP}$   
            $(\uparrow \text{SUBJ}) = \downarrow \quad \uparrow = \downarrow$   
            $(\downarrow \text{CASE}) = \text{c nom}$
- b.  $\text{KP} \rightarrow \quad \text{NP} \quad \quad \text{K}$   
            $\uparrow = \downarrow \quad \quad \uparrow = \downarrow$
- (12)  $i/\text{ka}, \quad \text{K}, \quad (\uparrow \text{CASE}) = \text{nom}$

Korean is exocentric in the sense that the category of a sentence is S, not the projection of V. However, Korean is assumed to be a configurational language that sets up a category VP (Choi 1996). That is reflected in the rule (11a). In addition, grammatical functions such as SUBJ and OBJ are determined by both the information of structural markers and the configuration. The constraining equation ‘ $(\downarrow \text{CASE}) = \text{c nom}$ ’ in (11a) requires that a subject must have a nominative case. The requirement is satisfied by the

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7 In addition, the data in Guaraní and Mobiles are presented in Nordlinger and Sadler (2007).



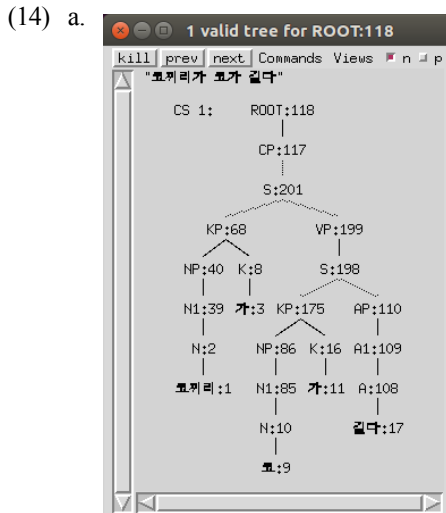
information of the case marker presented in (12).

To analyze the sentences with an omitted copula, Dalrymple et al. (2004) introduces the empty category epsilon ( $\epsilon$ ) into syntactic rules. The category does not appear in the c-structure but provides information about a copula.<sup>8</sup> According to the approach, we can present the following rule for VP category in (4).

$$(13) \text{ VP} \rightarrow \text{ S} \quad \epsilon$$

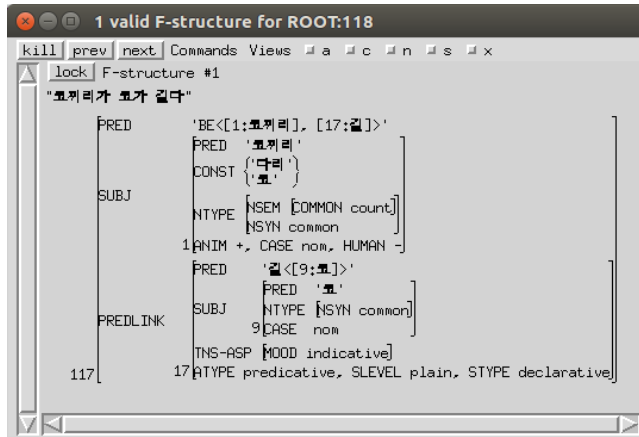
$$(\uparrow \text{PREDLINK}) = \downarrow \quad (\uparrow \text{PRED}) = \text{'BE'} < (\uparrow \text{SUBJ}) (\uparrow \text{PREDLINK}) >'$$

According to the rule, a new copula *be* is introduced that subcategorizes for SUBJ and PREDLINK. Using the rule, we can give the following c-structure and f-structure for the MNC (1a).



<sup>8</sup> There are some languages which require that the information of null predicate be specified at the lexicon (Nordlinger and Sadler 2007).

b.



As we see in the f-structure (14b), PREDLINK is assigned to the second clause *kho-ka kil-ta* using the epsilon category in (13) that does not appear in the c-structure (14a).

### 3. Lexical Relations

#### 3.1 Types of MNC

We saw that an MNC was constructed by the combination of a subject and a clausal predicate and that there must be some semantic constraints between NPs with nominative case markers. The previous studies have made proposals about the constraints. Below we review two previous approaches critically.

First, some studies set up a possessive relation between NPs syntactically or lexically, assuming the semantic identity between an MNC and its corresponding possessive construction (Yoon 1986). However, we cannot say that there is a unique relation such as possession, as we will see below. In addition, we bear the burden of assuming that all nouns subcategorize for a possessive noun. That view violates the principle of economy.

Second, there is an approach proposed in a construction grammar, where a predicate has the specification about the semantic relation between NPs with nominative case markers (Kim et al. 2007). For example, it is assumed that the predicate *kil-* in (1a) subcategorizes for a subject and a specifier. However, seen semantically, it is not clear

that the predicate subcategorizes for a specifier. Furthermore, the approach violates the locality condition which requires that a lexical item put a constraint on a local domain.

In this paper, we assume that a semantic relation between NPs plays a critical role in MNC, and that the semantic relations are restricted. As for semantic relations, many types have been proposed in previous works. The following classification is due to Cha (2008).

- (15) a. kokkili-ka       kho-ka       kil-ta  
 elephant-NOM   nose-NOM   long-DEC  
 'The nose of an elephant is long.'
- b. kay-ka       cintoskay-ka       yengliha-ta  
 dog-NOM   cintoskay-NOM   smart-DEC  
 'As for dogs, a cintoskay is smart.'
- c. yelum-i       maykcwu-ka   choyko-i-ta  
 summer-NOM   beer-NOM   best-be-DEC  
 'Beer is the best in summer.'
- d. nay-ka   sakwa-ka   coh-ta  
 I-NOM   apple-NOM   like-DEC  
 'I like apple.'
- e. Mary-ka   ton-i       manh-ta  
 Mary-NOM   money-NOM   lots-DEC  
 'Mary has a lot of money.'
- f. haksayng-i   sey   myeng-i       wa-ss-ta  
 student-NOM 3   person-NOM   come-pst-DEC  
 'Three students came.'
- g. Kim kyoswu-nim-i       manna-ki-ka       himtul-ta  
 Kim professor-HON-NOM   meet-NM-NOM   difficult-DEC  
 'Professor Kim is difficult to meet.'
- h. ku kwuk-i       siwenhan   kes-i       masiss-ta  
 the soup-NOM   cold       that-NOM   delicious-DEC  
 'The cold soup is delicious.'
- i. siktang-i       masiss-nun   kos-i       eps-ta  
 restaurant-NOM   delicious-MOD   that-NOM   not be-DEC  
 'There is no restaurant where food is delicious.'

However, if we examine the types in detail, some types are excluded from MNC (Chae and Kim 2008; Hong 2014). Above all, the types such as (15d) and (15e) are excluded from MNC. The predicates in (15d) and (15e) are not one-place predicates but two-place predicates. Furthermore, the types in (15f) to (15i) can be regarded as special constructions which need to be explained by different mechanisms. The type in (15f) is the so-called ‘quantifier floating’ construction, where a complex NP *haksayng sey myeng-i* is split into two NPs like *haksayng-i* and *sey myeng-i*. The type in (15i) is a NP-split construction. The type in (15g) is a TOUGH construction, where the NP *Kim kyoswu-nim-i* functions as an object of a nominal predicate *manna-ki*. Finally, the sentence in (15h) corresponds to internally headed relative clauses.

As a result, the types in (15a) to (15c) are considered to be a ‘true’ MNC where the predicate is a one-place predicate, and two NPs with nominative case markers appear. The type in (15a) shows the relation of inalienable possession, the type in (15b) the relation of type-token/supertype, and the type in (15c) a temporal relation. Furthermore, the type in (15a) can be divided into 3 subtypes, considering the classification of Ryu (2013).<sup>9</sup>

- (16) a. khokkili-ka kho-ka kil-ta. (=15a)  
 b. sokum-i alkayngi-ka kwulk-ta.  
 salt-NOM grain-NOM coarse-DEC  
 ‘The grains of salt are coarse.’  
 c. kia cha-ka kangphan-i twukkep-ta.  
 KIA car-NOM steel sheet-NOM thick-DEC  
 ‘KIA’s steel sheet is thick.’  
 d. khaylliphonia-ka sillikhonpaylli-ka ttattussha-ta  
 California-NOM Silicon Valley-NOM warm-DEC  
 ‘Silicon Valley in California is warm.’  
 e. paci-ka kili-ka ccalp-ta  
 pants-NOM length-NOM short-DEC  
 ‘The length of pants is short.’

<sup>9</sup> As for the relations, there have been some proposals (Yang 1972; Cha 2008; Ryu 2103). Among others, Ryu (2013) assumes 16 semantic relations. In Hong (2014), it is insisted that the examples in (16)-(18) are covered by a single relation like ‘possession’.

- (17) a. tokil-i                    catongcha-ka thunthunha-ta  
           germany-NOM car-NOM sturdy-DEC  
           ‘Germany’s cars are sturdy.’  
       b. ttal-i                    pwulpyeng-i taytanha-ta  
           daughter-NOM complaint-NOM lots-DEC  
           ‘My daughter complains very much.’
- (18) a. ku yeca-ka            kapang-i mesiss-ta  
           tat woman-NOM bag-NOM stylish-DEC  
           ‘Her bag is stylish.’  
       b. con-i                tongsayng-i chakha-ta  
           John-NOM brother-NOM good-hearted-DEC  
           ‘John’s brother is good-hearted.’

The examples in (16a)-(16e) represent a part-whole relation that corresponds to a metonymic relation in Ryu (2013).<sup>10</sup> In (17), the first NP produces or makes the second NP. In (18), the first NP owns or uses the second NP. Therefore, we have 5 types in total, including 2 types in (15b) and (15c).<sup>11</sup> In this paper, we try to describe 5 types of relation directly on the lexicon of a noun, different from the previous studies that used the subcategorization frame.

### 3.2 Qualia structure

Most syntactic theories include semantics apart from syntax. The semantics are sentential semantics that focuses on the compositionality of sentences. For example, there are glue semantics in LFG (Dalrymple 1999) and MRS in HPSG (Copestake et al. 2005). Those semantics are not careful about the concrete meaning of a word, regarding the meaning of a word as a logical word.

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10 We can say that the example in (16e) has a part-whole relation because the length is a property of pants. In addition, Ryu (2013) mentioned other examples for the type (16e) such as person-height, eyes-color, room-temperature, etc.

11 The type in (15c) includes the following example which represents a spatio-temporal relation.

- (i) I cibang-i            sakwa-ka manhi nan-ta.  
       this province-NOM apple-NOM a lots produced-DEC  
       ‘This province produces a lot of apples.’

However, the theory of Generative Lexicon (Pustejovsky 1995) emphasizes the various aspects of word meaning and enables the concrete description of the meaning. The theory criticizes the view that a lexicon is a set of static words and provides the mechanisms by which we can describe the meaning of words that is expanded productively depending on the context. Below we present the extended lexicon of LFG by accommodating the mechanisms of Generative Lexicon and try to analyze the semantic relations seen in (15b), (15c), (16), (17), and (18).<sup>12</sup>

In Generative Lexicon, the lexical meaning of words is represented in 4 substructures as Argument structure, Event structure, Qualia structure, Lexical Inheritance Structure. Argument Structure specifies the number and the type of logical arguments that a word requires. Event Structure represents the types of events that a word refers to and their internal structures. Qualia Structure represents the semantic quality of a word. Finally, Lexical Inheritance Structure shows which relation the semantic type of a word has with the semantic types of other words. If we adopt the Generative Lexicon into LFG, we can present the extended format of lexical information as follows.

$$(19) \left[ \begin{array}{ll} \text{PRED} & ' \dots < \dots > ' \\ \text{SUPERTYP} & \dots \\ \text{EVSTR} & \dots \\ \text{QUALIA} & \dots \end{array} \right]$$

In general, a lexical form has a semantic meaning that is represented as the value of PRED. The semantic meaning of predicates includes the subcategorization information that corresponds to Argument Structure in the Generative Lexicon. In addition, we set an attribute SUPERTYP for Lexical Inheritance Structure, an attribute EVSTR for Event Structure, and an attribute QUALIA for Qualia Structure anew. In this paper, we are concerned with Qualia Structure because Qualia Structure represents “the set of properties or events associated with a lexical item which best explain what that word means.” (Pustejovsky 1995: 77).

Qualia Structure is subdivided into 4 aspects or roles such as FORMAL, CONSTITUTIVE, TELIC, and AGENTIVE. FORMAL role specifies the property that distinguishes the object within a larger domain. CONSTITUTIVE role specifies the relation between an object and its constituent. TELIC role specifies the purpose and

<sup>12</sup> Badia and Sauri (2013) try to analyze the detailed lexical meaning by adopting the Generative Lexicon into HPSG.

function of the object. Finally, AGENTIVE role specifies factors involved in the origin of an object. The following is Qualia Structure for the noun *novel* (Pustejovsky 1995):

- (20) *novel*  
 QUALIA CONST= narrative(x)  
 FORMAL=book(x), disk(x)  
 TELIC= read(y,x)  
 AGENT= write(z,x)

In (20), Qualia Structure says that a novel is a book with narrative, and that its function is for someone to read it, and that it is created by a process of someone writing it.

Now, let us extend the lexicon in LFG by adopting Qualia Structure. We assume that the information of Qualia Structure is simply incorporated into the lexicon. As a result, the extended lexicon of nouns has the following form, focusing on Lexical Inheritance Structure and Qualia Structure:

- (21) 
$$\left[ \begin{array}{l} \text{PRED} \quad \%stem \\ \text{SUPERTYP} \quad \dots \\ \text{FORM} \quad \text{'...'} \\ \text{CONST} \quad \{ \dots \} \\ \\ \text{TELIC} \quad \left[ \begin{array}{l} \text{PRED} \quad \text{'...'} \\ \text{ARG1} \quad \text{'...'} \\ \text{ARG2} \quad \%stem \end{array} \right] \\ \\ \text{AGENT} \quad \left[ \begin{array}{l} \text{PRED} \quad \text{'...'} \\ \text{ARG1} \quad \text{'...'} \\ \text{ARG2} \quad \%stem \end{array} \right] \end{array} \right]$$

In (21), Qualia Structure is specified in 4 new attribute-value pairs. The CONSTITUTIVE role is represented in the value of an attribute CONST, and the FORMAL role in the value of an attribute FORM. The TELIC role and the AGENTIVE role are represented in the form of a predicate-argument structure, where the second argument is occupied by the semantic form of a word (“%stem”).

Now let us try to analyze the 5 types of MNC discussed in subsection 3.1 by using the format of an extended lexicon (21). Firstly, the type in (15b) is represented in the Lexical Inheritance Structure because the first noun is the super-type of the second noun. We can analyze the relation by putting the constraining equation ‘(↑SUBJ PRED FN) =c (↑PREDLINK SUBJ SUPERTYP)’ into the syntactic rule (13), as in (22).

$$(22) \text{ VP} \rightarrow \text{ S} \quad \varepsilon$$

$$(\uparrow \text{PREDLINK}) = \downarrow (\uparrow \text{PRED}) = \text{'BE}(\langle \uparrow \text{SUBJ} \rangle (\uparrow \text{PREDLINK}) \rangle \text{'}$$

$$(\uparrow \text{SUBJ PRED FN}) = \text{c} (\uparrow \text{PREDLINK SUBJ SUPERTYP})$$

The constraining equation requires that the semantic form of the first noun (SUBJ) equate with the value of the attribute SUPERTYP in the second noun (PREDLINK SUBJ). To satisfy the constraint, it is assumed that the NPs have the information required in the rule. For example, the first NP *kay* and the second NP *cintoskay* in (15b) have the following lexicon:

$$(23) \text{ kay, N, } (\uparrow \text{PRED}) = \text{'kay'}$$

$$\text{cintoskay, N, } (\uparrow \text{PRED}) = \text{'cintoskay'}$$

$$(\uparrow \text{SUPERTYP}) = \text{kay}$$

Secondly, let us deal with the type in (15c). The relation in (15c) represents an adjunct relation such as time and place. The relation seems to appear in many nouns whose referents are related to events in a way because an event is always located in a particular world composed of time and place. Therefore, we put the constraint (24a) for (15c) into the syntactic rule (13). Furthermore, we assume that the relevant NP has the required value of the attribute SUPERTYP, as in (24b):

$$(24) \text{ a. } (\uparrow \text{SUBJ SUPERTYP}) = \text{c} \{ \text{'time'} | \text{'place'} \}$$

$$\text{b. yelum, N, } (\uparrow \text{PRED}) = \text{'yelum'}$$

$$(\uparrow \text{SUPERTYP}) = \text{time}$$

Thirdly, let us turn to the type in (15a) which is divided into 3 subtypes (16), (17), and (18). We can relate the classification in (16)-(18) to Qualia Structure. That is, the type in (16) is related to CONSTITUTIVE role, the type in (17) to AGENTIVE role, and the type in (18) to TELIC role. Let us below deal with the subtypes respectively.

The first subtype in (16) shows part-whole relation which can be reflected by CONSTITUTIVE role. The analysis proceeds in a similar way as above. The syntactic rule (13) has the constraining equation which requires that the semantic form of the second noun be a member of the value of the attribute CONST in the first noun (25a). To satisfy the requirement, the first noun has the information for the role, as we see in



(25b).

- (25) a. ( $\uparrow$  PREDLINK SUBJ PRED FN)  $\in_c$  ( $\uparrow$  SUBJ CONST)
- b. kokkili, N, ( $\uparrow$  PRED)=‘kokkili’  
   ‘kho’  $\in$  ( $\uparrow$  CONST)  
   ‘tali’  $\in$  ( $\uparrow$  CONST).  
       kho, N, ( $\uparrow$  PRED)=‘kho’

That is, the first NP has the information about CONST role such as *kho*, *tali*, etc. and the second NP represents one of the values. As a result, sentence (16a) is allowed as an MNC.

The second subtype in (17) shows the relation of production which can be reflected in AGENTIVE role. We, therefore, assume the constraining equation (26a) in (13), where the first noun or its super-type plays a role of an argument in a predicate whose second argument the second noun is. Furthermore, it is assumed that the first and the second NP have the information required by the constraining equation, as we see in (26b).

- (26) a.  $\{(\uparrow$  SUBJ PRED FN) $\in_c$  ( $\uparrow$  PREDLINK SUBJ AGENT ARG1)|  
       ( $\uparrow$  SUBJ SUPERTYP) $\in_c$  ( $\uparrow$  PREDLINK SUBJ AGENT ARG1) $\}$
- b. tokil, N, ( $\uparrow$  PRED)= ‘tokil’  
   ( $\uparrow$  SUPERTYP)= ‘kukka’  
       catongcha, N, ( $\uparrow$  PRED)= ‘catongcha’  
   ( $\uparrow$  AGENT PRED)= ‘mantul-’  
   ( $\uparrow$  AGENT ARG1)= ‘kukka’  
   ( $\uparrow$  AGENT ARG2)= ‘catongcha’

The third subtype in (18) shows the relation of use which can be reflected in TELIC role. In a similar way as the previous types, we assume the constraining equation (27a) in (13), where the first noun or its super-type plays the role of an argument in a predicate whose second argument the second noun is. To satisfy the constraint, we also assume that the first and the second NP have the information required by the constraint, as we see in (27b):

- (27) a.  $\{(\uparrow \text{SUBJ PRED FN})=c (\uparrow \text{PREDLINK SUBJ TELIC ARG1})$   
 $(\uparrow \text{SUBJ SUPERTYP})=c (\uparrow \text{PREDLINK SUBJ TELIC ARG1})\}$
- b. yeca, N,  $(\uparrow \text{PRED})= \text{'yeca'}$   
 $(\uparrow \text{SUPERTYP})= \text{'salam'}$   
 kabang, N,  $(\uparrow \text{PRED})= \text{'kabang'}$   
 $(\uparrow \text{TELIC PRED})= \text{'kaci-'}$   
 $(\uparrow \text{TELIC ARG1})= \text{'salam'}$   
 $(\uparrow \text{TELIC ARG2})= \text{'kabang'}$

Until now, we dealt with 5 types of MNC by putting constraining equations into the syntactic structure (13) and giving the required information to the lexicon. We see below the results of the analysis about 5 types of MNC in (28a) and the analysis failure about the ungrammatical sentence (2a) that does not show any above-mentioned relation in (28b).

- (28) a. 

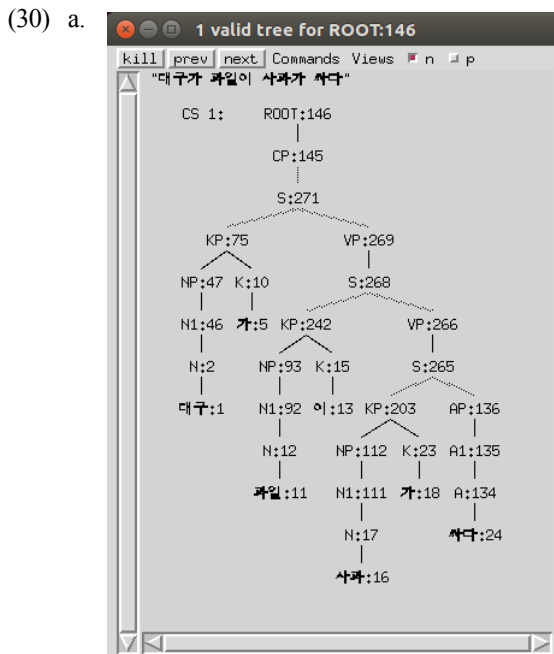
```
% parse "개가 진돗개가 영리하다"
parsing {개가 진돗개가 영리하다}
1+1 solutions, 0.008 CPU seconds, 0.346MB max mem, 60 subtrees unified
1+1
% parse "코끼리가 코가 길다"
parsing {코끼리가 코가 길다}
1+1 solutions, 0.006 CPU seconds, 0.302MB max mem, 60 subtrees unified
1+1
% parse "독일이 자동차가 튼튼하다"
parsing {독일이 자동차가 튼튼하다}
1+1 solutions, 0.006 CPU seconds, 0.378MB max mem, 60 subtrees unified
1+1
% parse "그 여자가 가방이 멋있다"
parsing {그 여자가 가방이 멋있다}
1+1 solutions, 0.006 CPU seconds, 0.405MB max mem, 68 subtrees unified
1+1
% parse "여름이 맥주가 최고이다"
parsing {여름이 맥주가 최고이다}
1+1 solutions, 0.005 CPU seconds, 0.279MB max mem, 58 subtrees unified
1+1
```
- b. 

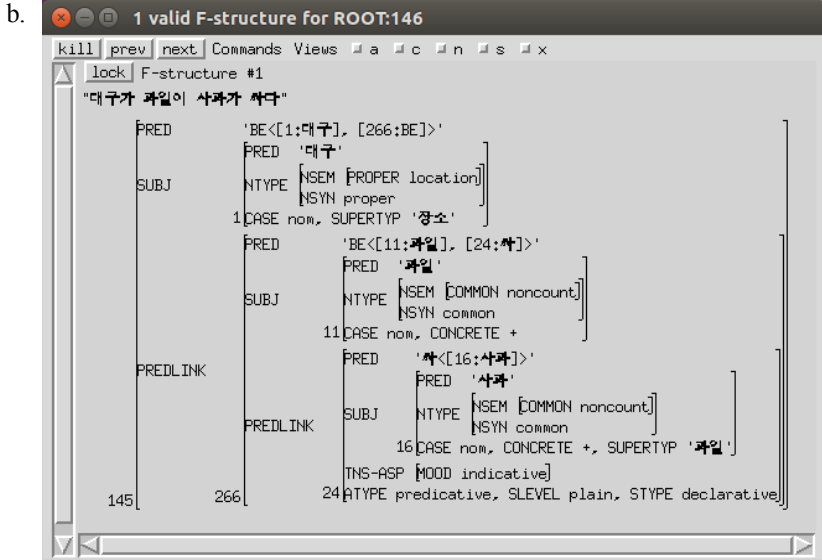
```
% parse "사과가 코가 길다"
parsing {사과가 코가 길다}
0 solutions, 0.004 CPU seconds, 0.272MB max mem, 60 subtrees unified
0
```

Now, we can find the sentences where more than two NPs with a nominative case marker appear, as follows.

- (29) a. Taykwu-ka kwait-i sakwa-ka ssa-ta.  
 Taykwu-NOM fruit-NOM apple-NOM cheap-DEC  
 ‘In Taykwu, apple among fruit is cheap.’
- b. apeci-ka kwutwu-ka han ccak-i kwumeng-i nass-ta.  
 father-NOM shoes-NOM 1 piece-NOM hole-NOM make-PST-DEC  
 ‘There was a hole in a piece of my father’s shoes.’

In principle, we can generate the sentences by applying the modified version of the syntactic rule (13) cyclically, so long as one of the constraints presented above is satisfied. For example, the constraint (24a) is applied between the first and the second NP, and the constraint (25a) between the second and the third in (29a). Therefore, we get the right analysis for (29a), as we see in the c-structure (30a) and f-structure (30b).





### 3.3 Information Structure

In this subsection, we discuss how the MNC interacts with the information structure.<sup>13</sup> In general, Korean discourse information is determined by morphological information and syntactic configurations. For example, a concept ‘topic’ in Korean appears at the beginning of a sentence and is expressed by a delimiter *un/nun*.<sup>14</sup> Therefore, we assume that the rule (31) and the lexicon (32) are responsible for the function TOPIC.

$$\begin{array}{l}
 (31) \text{ a. } CP \rightarrow \quad NP \qquad \qquad \qquad S \\
 \quad \quad \quad (\uparrow \text{TOPIC}) = \downarrow \qquad \qquad \qquad \uparrow = \downarrow \\
 \quad \quad \quad (\uparrow \text{COMPENS}^* \text{ GF}) = \downarrow \\
 \quad \quad \quad (\downarrow \text{THEME}) = c +
 \end{array}$$

13 LFG provides the level of discourse besides syntactic or semantic level to analyze sentences. We use the version of LFG (Dalrymple 2001, Bresnan et al. 2016), where the discourse information is represented in a f-structure. In the recent LFG, the discourse information is represented in the separate structure which is derived from a c-structure or an f-structure (Dalrymple et al. 2019).

14 The NP marked by *un/nun* that appears in the middle of a sentence represents a concept ‘contrast’, irrespective of topic or focus.

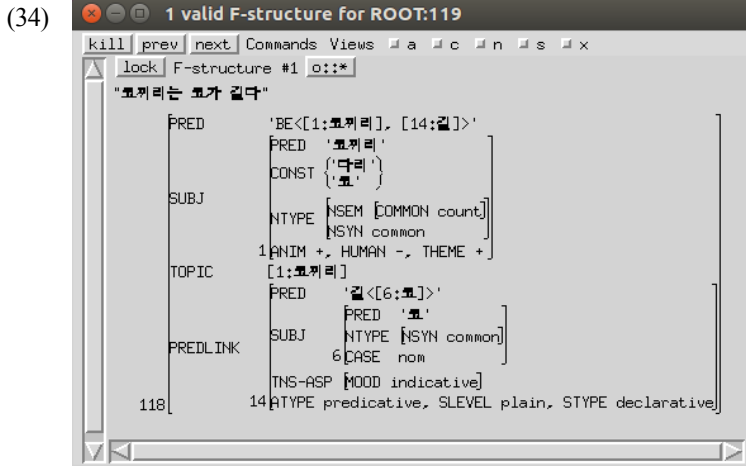
- b. NP → NP Del  
 $\uparrow = \downarrow$   $\uparrow = \downarrow$   
 (32) un/nun, Del, ( $\uparrow$  THEME)= +

According to rule (31a), TOPIC function must be linked with one of the arguments through the functional schema ( $\uparrow$  COMPFNS\* GF)= $\downarrow$  to satisfy Extended Coherence Condition (ECC). In addition, there must be an NP that includes the information [THEME +] that is percolated from the delimiter presented in (32).

In the case of MNC, TOPIC can be assigned to the first NP if the marker of the NP is changed into the delimiter *un/nun*, as follows:

- (33) a. kokkili-nun kho-ka kil-ta.  
 elephant-TOP nose-NOM long-DEC  
 'As for an elephant, its nose is long.'  
 b. tokil-un catongcha-ka thunthunha-ta.  
 Germany-TOP car-NOM sturdy-DEC  
 'As for Germany, its cars are sturdy.'  
 c. ku yeca-nun kapang-i mesiss-ta.  
 that woman-TOP bag-NOM stylish-DEC  
 'As for the woman, her bag is stylish.'  
 d. kay-nun cintoskay-ka yengliha-ta.  
 dog-TOP cintoskay-NOM smart-DEC  
 'As for dogs, a cintoskay is smart.'  
 e. yelum-un maykcwu-ka choyko-i-ta.  
 summer-TOP beer-NOM best-be-DEC  
 'In summer, beer is the best.'

The examples above can be explained in the way presented in the previous section. As for TOPIC, it is linked with an argument function SUBJ that is subcategorized by PREDLINK and therefore satisfies ECC. For example, the following shows the f-structure for (33a):



Next, let us deal with the case, where the order of NPs in MNC is reversed. If the order of NPs is different from that of the original MNC, we cannot expect that the grammaticality is the same. Below we see the difference in grammaticality if we reverse the NPs in MNC (Choi 2008).

- (35) a. kho-ka/nun kokkili-ka kil-ta
- b. catongcha-ka/nun tokil-i thunthunha-ta
- c. maykcwu-ka/nun yelum-i choyko-i-ta
- (36) a. \*kapang-i/nun ku yeca-ka mesiss-ta
- b. \*cintoskay-ka/nun kay-ka yengliha-ta

The reverse order is allowed in types of semantic relations such as CONSTITUTIVE, AGENTIVE, TEMPORAL roles (35), but not in types of semantic relations such as TELIC and SUPERTYPE roles (36), regardless of the marker in the first NP. The reason for the difference in grammaticality seems to lie in the possibility of inference of the original meaning, as we see below.

- (37) a. An elephant is long.  $\rightsquigarrow$  A part of elephant's body is long  $\rightsquigarrow$   
 The nose of an elephant is long
- b. Germany is sturdy.  $\rightsquigarrow$  A product made in Germany is sturdy.  $\rightsquigarrow$   
 A car made in Germany is sturdy.

- c. Summer is best.  $\rightsquigarrow$  Something enjoyed in summer is best.  $\rightsquigarrow$   
 Beer enjoyed in summer is best.
- (38) a. She is cool.  $/\rightsquigarrow$  Her bag is cool.  
 b. A dog is smart.  $/\rightsquigarrow$  A cindoskay among dogs is smart.

We can infer the meaning of the original sentence in the first type, even if we omit the first NP, as in (37). But we cannot infer the meaning of the original sentence in the second type if we omit the first NP, as in (38). In that case, we rather get a new meaning different from that of the original sentence.

Therefore, we need a kind of negative constraint that is responsible for the ordering. We add the constraint (39) into the syntactic rule (13) of the second type:<sup>15</sup>

- (39) ( $\uparrow$  PREDLINK SUBJ)  $\sim$ <h ( $\uparrow$  SUBJ)

The constraint in (39) requires that all syntactic nodes corresponding to PREDLINK|SUBJ must not precede those corresponding to SUBJ. The examples in (36) violate the constraint (39) and therefore are ungrammatical, whereas those in (35) do not have the constraint and so are allowed.

Now, let us explain the difference between *kho-nun* and *kho-ka* in (35). As we mentioned beforehand, the marker *un/nun* represents the grammatical function TOPIC. As for the marker *i/ka*, we have seen that it represents the grammatical function SUBJ. But, if its head noun appears at the abnormal position, it is assumed to represent the grammatical function FOCUS, i.e., new information. The following example shows that the first NP with a nominative case marker acts as a focus (Kim et al. 2007).

- (40) A: nwukwu-ka apeci-ka kyoswu-i-si-ni?  
 who-NOM father-NOM professor-be-HON-QUE  
 'Whose father is a professor?'  
 B: con-i apeci-ka kyoswu-i-si-ta.  
 John-NOM/FOC father-NOM professor-be-HON-DEC

15 The constraint in (39) is based on the concept 'head precedence' defined as follows in XLE (Crouch et al. 2011):

f1 <h f2 is true iff. f1 and f2 have heads and the head of f1 precedes the head of f2.

‘John’s father is a professor.’

Accordingly, if we analyze the MNC (35) from the viewpoint of information structure, we can assign TOPIC or FOCUS to the first NP according to the marker. The followings show the f-structures for (35a).

(41) a.

```

1 valid F-structure for ROOT:119
lock F-structure #1 o:!*
'kho-neo kyo-keo-ri-ga gil-da'
├── PRED 'BE<[6:kho-keo-ri], [14:gil]>'
│   ├── PRED 'kxo-keo-ri'
│   ├── CONST {'dali'}
│   └── SUBJ
│       ├── NTYPE [NSEM [COMMON count]]
│       ├── NSYN common
│       └── 6[ANIM +, CASE nom, HUMAN -]
│           ├── PRED 'kxo'
│           ├── NTYPE [NSYN common]
│           └── 1[THEME +]
│               ├── PRED 'gil<[1:kxo]>'
│               ├── SUBJ [1:kxo]
│               └── PREDLINK
│                   ├── TNS-ASP [MOOD indicative]
│                   └── 14[ATYPE predicative, SLEVEL plain, STYPE declarative]
└── 118
    
```

b.

```

1 valid F-structure for ROOT:118
lock F-structure #1 o:!*
'kxo-ga kyo-keo-ri-ga gil-da'
├── PRED 'BE<[9:kxo-keo-ri], [17:gil]>'
│   ├── PRED 'kxo-keo-ri'
│   ├── CONST {'dali'}
│   └── SUBJ
│       ├── NTYPE [NSEM [COMMON count]]
│       ├── NSYN common
│       └── 9[ANIM +, CASE nom, HUMAN -]
│           ├── PRED 'kxo'
│           ├── NTYPE [NSYN common]
│           └── 1[CASE nom]
│               ├── PRED 'gil<[1:kxo]>'
│               ├── SUBJ [1:kxo]
│               └── PREDLINK
│                   ├── TNS-ASP [MOOD indicative]
│                   └── 17[ATYPE predicative, SLEVEL plain, STYPE declarative]
└── 117
    
```

The NP *kho* is assigned TOPIC in f-structure (41a) and FOCUS in (41b) and is linked with SUBJ of PREDLINK. Therefore, the f-structures satisfy ECC and are acceptable. In addition, we below see the analysis results of the other sentences in (35) and (36).



- (42) a. 

```
% parse "자동차는 부품이 튼튼하다"
parsing {자동차는 부품이 튼튼하다}
1+1 solutions, 0.004 CPU seconds, 0.329MB max mem, 46 subtrees unified
1+1
% parse "맥주는 여음이 최고이다"
parsing {맥주는 여음이 최고이다}
1+1 solutions, 0.003 CPU seconds, 0.248MB max mem, 46 subtrees unified
1+1
```
- b. 

```
% parse "가방은 그 여자가 멋있다"
parsing {가방은 그 여자가 멋있다}
0 solutions, 0.005 CPU seconds, 0.345MB max mem, 54 subtrees unified
0
% parse "진돗개는 개가 영리하다"
parsing {진돗개는 개가 영리하다}
0 solutions, 0.004 CPU seconds, 0.315MB max mem, 46 subtrees unified
0
```

#### 4. Conclusion

We can summarize the discussion as follows: Firstly, we adopted the null copula which subcategorizes for SUBJ and PREDLINK, following the view that an MNC is a combination of a subject and a clausal predicate. As a result, we could generate MNC at the syntactic level. Secondly, we saw that there must be some lexical relations between NPs with nominative markers. We set up the constraints reflecting Qualia Structure of Generative Lexicon in the syntactic rules. Therefore, we got the acceptable MNC, which satisfies one of the lexical relations. Finally, we dealt with the interaction with information structure. We saw that the grammaticality of the sentence with the reversed order among NPs improves if we assign TOPIC or FOCUS to MNC.

In this paper, we presented the analyses of the MNC specific to Korean within the framework of LFG. We saw that those analyses could solve the problems presented in previous studies. Furthermore, our analyses are implemented on XLE, the platform of LFG, which enables us to prove the validity of the linguistic analysis. Our analysis can be extended into the so-called ‘Multiple Accusative Construction’ that behaves itself in a similar way. We will defer the analysis to future research.

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